What is claimed is:

1. A bonding apparatus for a semiconductor chip, comprising:

ultrasonic vibration generating unit which applies an ultrasonic vibration to a contact region where a bonding portion of said semiconductor chip is in contact with a bonding portion of another part to be bonded to said semiconductor chip, via a mount tool for holding said semiconductor chip, so that said ultrasonic vibration increases a die shear strength that is a shear strength of an entire bonding region to be formed between said semiconductor chip and said part which are to be bonded in an ultrasonic-vibration-axial direction;

holding force control unit which controls vibration-axial directional holding force or a shear strength of an entire contact interface of said semiconductor chip to be held by said mount tool and said mount tool in said ultrasonic-vibration-axial direction;

inertial force control unit which controls inertial force in said ultrasonic-vibration-axial direction, which is generated on said semiconductor chip to be held by said mount tool by said ultrasonic vibration; and

control management unit which maintains a relationship of

(vibration-axial directional holding force) > (die shear strength) + (inertial force).

2. The bonding apparatus according to claim 1, wherein said holding force control unit comprises at least

one of unit for applying a vertical load from said mount tool to a contact surface of said mount tool with said semiconductor chip to be held by said mount tool and chuck unit, installed inside said mount tool, for chucking said semiconductor chip to be held by said mount tool.

3. The bonding apparatus according to claim 1, wherein said inertial force control unit comprises at least one of unit which changes a vibration frequency of said ultrasonic vibration and unit which changes a vibration amplitude of said ultrasonic vibration.

4. The bonding apparatus according to claim 1, wherein said control management unit includes a memory device where data about a variation in said die shear strength stored beforehand is saved.

5. The bonding apparatus according to claim 1, wherein said control management unit includes unit measuring said die shear strength or a substitute characteristic thereof.

6. The bonding apparatus according to claim 1, wherein said control management unit includes unit measuring said vibration-axial directional holding force or a substitute characteristic thereof.

7. A bonding method for a semiconductor chip, comprising the steps of:

applying an ultrasonic vibration to a contact region where a bonding portion of said semiconductor chip is in contact with a bonding portion of another part to be bonded to said semiconductor chip, via a mount tool for holding

said semiconductor chip; and

controlling vibration-axial directional holding force, which is a shear strength of an entire contact interface of said semiconductor chip to be held by said mount tool and said mount tool in an ultrasonic-vibration-axial direction, and inertial force in said ultrasonic-vibration-axial direction, which is generated on said semiconductor chip to be held by said mount tool by said ultrasonic vibration, thereby maintaining a relationship of

(vibration-axial directional holding force) > (die shear strength) + (inertial force).

8. The bonding method according to claim 7, further including the step of reducing said ultrasonic vibration to such an amplitude that immediately before stopping said ultrasonic vibration, said ultrasonic vibration can be absorbed with plastic deformation of at least one of said bonding portions of those two parts which are to be bonded.

9. The bonding method according to claim 7, further including the steps of:

designing a structure of at least one of said bonding portions of those two parts which are to be bonded into a so-called stud bump whose distal end has a protruding shape;

making said bonding portions of said two parts to be bonded contact with each other; and

causing plastic deformation of at least one of projections at distal ends of said stud bump to thereby increase an area of contact.

10. The bonding method according to claim 7, wherein

at least one of said bonding portions of those two parts which are to be bonded is heated in at least a part, and desirably all, of a time over which said ultrasonic vibration is applied.

11. The bonding method according to claim 7, wherein the structure of said bonding portion of said semiconductor chip to be held by said mount tool is a bump having at least one of gold, aluminum and copper as a material for a topmost surface, and

said part to be bonded to said semiconductor chip is a wiring board which has a pad having at least one of gold, aluminum and copper as a material for a topmost surface.

12. The bonding method according to claim 7, wherein the structure of said bonding portion of said semiconductor chip to be held by said mount tool is a pad having at least one of gold, aluminum and copper as a material for a topmost surface, and

said part to be bonded to said semiconductor chip is a wiring board the structure of whose bonding portion has at least one of gold, aluminum and copper as a material for a topmost surface.

13. The bonding method according to claim 7, wherein the structure of said bonding portion of said semiconductor chip to be held by said mount tool is a pad having at least one of gold, aluminum and copper as a material for a topmost surface, and

said part to be bonded to said semiconductor chip is another semiconductor chip which has a bump having at least

one of gold, aluminum and copper as a material for a topmost surface, or a part including said another semiconductor chip as a structural element.

14. The bonding method according to claim 7, wherein the structure of said bonding portion of said semiconductor chip to be held by said mount tool is a bump having at least one of gold, aluminum and copper as a material for a topmost surface, and

said part to be bonded to said semiconductor chip is another semiconductor chip which has a pad having at least one of gold, aluminum and copper as a material for a topmost surface, or a part including said another semiconductor chip as a structural element.

15. The bonding method according to claim 7, wherein the structure of said bonding portion of said semiconductor chip to be held by said mount tool is a bump having at least one of gold, aluminum and copper as a material for a topmost surface, and

said another part to be bonded to said semiconductor chip is another semiconductor chip which has a bump having at least one of gold, aluminum and copper as a material for a topmost surface, or a part including said another semiconductor chip as a structural element.